

Final Exam Review Sheet: *Worksheet 1*

Honors Chemistry

A.Problem Section - Be sure you show 1) the equation you will be using, 2) the numbers put in that equation with units, and 3) The answer.

- 1) What is the density of a substance that contains 47.2 grams in 17 ml? Will the substance float in water?
- 2) A certain liquid has a density of 0.125g/cm^3 . What volume would be needed to obtain 80 grams of this liquid?
- 3) How many grams of ammonia are contained in 125 ml of ammonia gas at 3040 mmHg and 42°C .
- 4) A gas with a pressure of 2.0 atm at 25°C is allowed to expand to standard pressure. What is the new temperature?
- 5) A gas at 950 mmHg and 30.0°C has a volume of 333 mL. What would the volume be at STP?
- 6) How much heat would be needed to raise the temperature of 50.0 ml of water at 20.0°C to the boiling point? ($C_{\text{ice}} = 0.5 \text{ cal/g}^\circ\text{C}$)
- 7) 455 cal of heat energy is added to a 2.80 Kg of steel at 35.0°C . What is the final temperature of the steel? ($C_{\text{Steel}} = 0.11 \text{ cal/g}^\circ\text{C}$)
- 8) How much heat would be needed to change 40.0 g of ice at -20.0°C into liquid at 80.0°C ? ($C_{\text{ice}} = 0.5 \text{ cal/g}^\circ\text{C}$ $H_{\text{ice}} = 80 \text{ cal/g}$)
- 9) How much heat would be needed to heat 75 ml of liquid water at its melting point to liquid water at the boiling point?
- 10) How much heat would be needed to melt 125 grams of ice at the melting point?
- 11) 525 calories of heat energy is added to a 111 g piece of steel at 20.0°C . What is the final temperature of the steel?
- 12) 25 ml of ethanol, density 0.79g/ml , has a temperature of 25°C . How much heat will it take to raise the temperature of the ethanol to its boiling point of 79°C ? ($C_{\text{ethanol}} = 0.38\text{cal/g}^\circ\text{C}$)
- 13) Convert the following:
 - a. 50g potassium sulfate = ? moles
 - b. 0.0750 moles sodium chlorate = ? grams
 - c. 7.25×10^{24} molecules silver nitrate = ? grams
 - d. 4.67 grams ammonium hydroxide contain ? hydrogen atoms
- 14) What is the percent composition by mass of each element in iron (III) sulfite?
- 15) What is the percent composition by mass of each element in the compound magnesium sulfate heptahydrate?
- 16) A compound contains 36.5% sodium, 25.4% sulfur and 38.1% oxygen by mass. Find the empirical formula.
- 17) A compound with a molar mass of 380 g/mole is 47.37 % carbon, 10.53 % hydrogen and 42.11 % oxygen. Find the empirical and molecular formula.
- 18) A compound with a molar mass of 134 g/mole is 34.3% sodium, 17.9% carbon and 47.8% oxygen. Find the empirical and molecular formula.
- 19) 15 grams of $\text{C}_3\text{H}_7\text{OH}$ is burned in 48 grams of oxygen. A. How many grams of carbon dioxide are formed? B. How many grams of water vapor are formed? C. Which reactant is left over, and how many grams are left.
- 20) A. How many grams of Ammonium chloride must be decomposed into NH_3 and HCl to form 11.2 liters of NH_3 gas at STP? B. How many grams of HCl will also be formed?

- 21) 34.5 g of sodium is reacted with excess sulfuric acid in a single replacement reaction.
 A. How many grams of each product are produced in the reaction? B. What volume of 3.00 M sulfuric acid would be needed in the reaction if you wanted no excess?
- 22) 39.0 grams of C_6H_6 is burned in 105 g of oxygen. A. How many grams of each product is produced? B. If any reactant remains unreacted, which one is it and how many grams are left over?

B. Equations – Write and balance the following equations.

1. Composition of copper (II) bromide from elements.
2. Decomposition of ammonium carbonate into elements.
3. Double replacement between tin (IV) hydroxide and aluminum nitrate.
4. Single replacement between barium oxide and phosphorous.
5. Single replacement between zinc oxalate and lithium.
6. Combustion of $C_8H_{17}OH$.

C. Questions

1. Name 8 physical properties of matter.
2. In terms of density, describe when one substance will float on another.
3. What is the limiting reagent in a chemical reaction.
4. Put two objects together that have the same mass. One has a temperature of 20 °C and the other is 40 °C. Will the temperature end up at 30 °C when equilibrium is reached? Explain.

List of useful constants

334 J/g or 80 cal/g	Heat of fusion for water (melting or freezing) H_f
2260 J/g or 541 cal/g	Heat of vaporization for water (evap. or condns.) H_v
2.1 J/g°C or 0.5 cal/g°C	Heat capacity (c) of solid water
4.18 J/g°C or 1.0 cal/g°C	Heat capacity (c) of liquid water
0.11 cal/g°C	Heat capacity (c) of steel
0.38 cal/g°C	Heat capacity (c) of ethanol

$$1.0 \text{ atm} = 760 \text{ mmHg}$$

Answers:

1) 2.8 g/mL, No	2) 640 mL	3) 0.33 g	4) -120°C
5) 380 mL	6) 2000 cal or 8400 J	7) 36.5° C	8) 28.4 kJ or 6780 cal
9) 31 kJ or 7500 cal	10) 40 kJ or 1000 cal	11) 63.0 °C	12) 410 cal
13) a) 0.3 moles	13) b) 7.99 g	13) c) 2.05 kg (12 moles)	13) d) 4.02 E23 atoms
14) 28%Fe, 24%S, 48%O	15) 10%Mg, 13%S, 71%O, 6%H	16) Na_2SO_3	17) $C_3H_8O_2$, $C_{15}H_{40}O_{10}$
18) $NaCO_2$, $Na_2C_2O_4$	19) A) 33 g CO_2	19) B) 18 g H_2O	19) C) 12 g O_2 leftover
20) A) 26.8 g NH_4Cl	20) B) 18.3 g HCl	21) A) 1.5g H_2 , 107g Na_2SO_4	21) B) 250 mL
22) A) 115g CO_2 , 24 g H_2O	22) B) 4.9 g C_6H_6 Leftover		

